Optimizing Logistics Processes

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Abstract

The Sokos Jyväskylä department store is making the biggest investment in history. Each department at a time is undergoing big changes and the logistics department is one of the departments. Together with the logistics department supervisor we took part in the development group established by the S-group. The main goal for the development group was to invent new ways to handle the growing material flows with the same resources available. There also were also other problems to be solved inside the logistics department at Jyväskylä: the age structure was old and new methods or working habits would be quite hard to digest. The main point was to help the employees of the logistics department to familiarize themselves with new methods and test the functionality of the methods.

In order to get any data the author surveyed the new method called “morning load” and actively participated in the everyday work to find out the main time losses in order to optimize the logistics working environment. Also the other new working method called the “handling centre” was under the examination. The handling centre was taken into use and is now under a test run.

The results of the research were good and they showed that the new methods are going to be successful and economical. With these two new methods the logistics department should be able to handle the growing material flows more easily and there would not be any kind of bottle necks in the work.

Keywords

Optimizing logistics, inventory, electronic data interchange, ABC-analysis

Miscellaneous

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Tiivistelmä

Jyväskylän Sokos kauppakeskus tekee historiansa suurinta investointiaan. Jokainen osasto vuorollaan käy läpi suuria muutoksia ja logistiikkaosasto on yksi niistä. Yhdessä logistiikkapäällikön kanssa osallistuimme S-ryhmän järjestämään kehitysryhmään, jonka tarkoituksena oli keksiä uusia tapoja kontrolloida kasvavia tavaravirtoja jo olemassa olevilla resursseilla. Sen lisäksi logistiikkaosastolla oli muitakin ongelmia: työntekijöiden keski-ikä oli aika vanha ja uudet metodit ja työtavat olisivat vaikeita oppia. Pääajatuksena oli auttaa ja logistiikkaosaston työntekijöitä uusien metodien kanssa ja samalla testata niiden toimivuutta.

Tietoja kerättiin tutkimalla ”aamulataus” metodia ja osallistui aktiivisesti jokapäiväiseen työhön selvittäen samalla suurimmat hukka-ajat saadakseen logistiikkaosaston toimimaan tehokkaammin. Työssä tarkasteltiin myös ”käsittelykeskus” toimintaa, joka otettiin käyttöön ja on nyt testiajossa.

Tutkimuksen tulokset olivat hyviä ja ne osoittivat, että uudet metodit olisivat menestyviä ja taloudellisesti kannattavia. Tulosten tiedoilla logistiikkaosaston pitäisi pystyä käsittelemään kasvava materiaalivirta helpommin eikä minkäänlaisia pullonkauloja pitäisi syntyä.

Avainsanat (asiasanat)
Logistiikan optimointi, inventointi, elektronisen tiedon vaihto , ABC-analyysi

Muut tiedot

Contents

1 Aims and Approaches of the Study

The Jyväskylä Sokos is one of the leading companies in Central-Finland. Right now they are doing a massive construction work where they are rebuilding the whole commercial center. Because of this one department at a time is undergoing big changes, and like all the others, the logistics department is also at the breaking point.

The logistics department is now working at the different location than the actual department store. After the big remodeling is done the logistics department gets whole new facilities inside the department store. This is most likely to happen at the beginning of 2010 and after that there are quite big challenges ahead.

The aim of this Bachelor's Thesis is to provide for the logistics department enough information and research so that they can operate smoothly after the move. One big issue is the fact that the material flow will double during the next few years, and some new techniques must be found to handle the flow as smoothly as possible with the same resources available.

The other big issue is to make the employees familiar with the new techniques and help them to use all the technical help available. Right now some of the people are still using the old methods in their work and this reorganization of the work could be a problem to them. Teaching old dog new tricks is always a challenge.

The Jyväskylä Sokos logistics department is one of the participants in the pilot project that handles the logistical remodeling. The aim is to develop all the Sokos' logistic departments with the help of a few pilot participants. The main focus of this project is on getting the material flow as constant as possible and on introducing and adopting a whole new concept of "a handling center" so that in the end the only work for the logistics department is the product placement onto the shelves.

The source materials of this study are previous researches combined with the new ones. The main work is to make the wheels running and make the adoption of the new methods as easy as possible. This study properly done should also help the cashiers' work with the material flow. In the new department store, good communication and data interchange is one of the key issues to success.

2 S-Group

2.1 S-group in General

S-group is strategic group company establish in 1904. It consists of 22 independent district companies and together they own Suomen Osuuskauppojen Keskuskunta (SOK) and their daughter companies. In addition the S-group owns 16 local companies and it operates in 1500 different cities in Finland. The group itself employs 37735 people and the company's goal is to produce services and assets to its customers. The S-group's sales were 11 821 Million euros in 2008.

The 22 district companies are: Osuuskunta Varuboden, Etelä-Karjalan Osuuskauppa, Etelä-Pohjanmaan Osuuskauppa, Helsingin Osuuskauppa Elanto, Jukolan Osuuskauppa, Koillismaan osuuskauppa, Osuuskaupppa Arina, Osuuskauppa Hämeenmaa, Keskimaa Osuuskunta, Osuuskauppa Keula, Osuuskauppa KPO, Osuuskauppa Maakunta, Osuuskauppa Osla, Osuuskauppa PeeÄssä, Osuuskauppa Suur-Savo, Osuuskauppa Ympyrä, Osuuskauppa Ympäristö, Pirkanmaan Osuuskauppa, Pohjois-Karjalan Osuuskauppa, Suur-Seudun Osuuskauppa, Satakunnan Osuuskauppa and Turun Osuuskauppa.

In addition, the S-group owns many chain companies which are: ABC, Agrimarket, Alepa, Amarillo, Automaa, Chico's, Coffee House, Emotion, Fransmanni, Freetime, Holiday Club, Memphis, Kodin Terra, Multasormi, Night-ravintolat, Presso, Prisma, Public Corner, Radisson SAS Hotels and Resorts, Rosso, Rosso Express, S-Market, S-group's Car dealers, Sale, Sevilla, Sokos, Sokos Hotels.

2.2 Keskimaa

Keskimaa is one of the biggest employers in Mid-Finland and has about 1830 employees. Keskimaa OSK owns markets, special shops, hotels, restaurants and gas stations. It has over 100 locations here in Mid-Finland's business district. The sales in 2008 were about 598 Million Euros. In 2008 Keskimaa also bought services and products from 2000 other companies. There is not only one person owning the company, 90 000 Mid-Finland customers own Keskimaa together. Keskimaa pays bonus to them about 17 Million euros every year. Keskimaa owns all of the following places: *Food Shops* = S-Market (26pc), Sale (17pc), Prisma (2pc) and Mestarin Herkku, *Special Shops* = Prisma (2pc) and Sokos. *Hotels and Restaurants* = Sokos Hotels Alexandra and Jyväshovi, Amarillo, Anneli Jyväskylä, Ale Pub Vaajakoski, Birra, El Toro, Hovi Public Bar, Fransmanni, Franseska, Gastropub Jalo, Freetime, Memphis, Patruuna, Pupujussi, Rosso Jyväskeskus, Rosso Kirkkopuisto, Rosso Jämsä, Fever, O'Malley's, Jyväshovi and Paviljonki Ravintolat. *Coffee Shops and Fast Food* = Café Emmy, Panorama, Coffee House, Food Court Sokos and Seppälä (Hesburger, Rosso Express, Presso) and Hesburger Matkakeskus. *Gas stations* = ABC Vaajakoski, ABC Keljonkangas, ABC Keuruu, ABC Hirvaskangas and Shell Veturi.

2.3 Sokos Jyväskylä

The Sokos department stores are located in the middle of the biggest cities in Finland. There are 10 big Sokos and 12 smaller ones in Finland. The product selection at Sokos is wide, consisting of domestic, international and its own labels. The employees at Sokos are trying to do the shopping experience more pleasant for the customers by being friendly and professional.

Jyväskylä Sokos is divided into two different parts: grocery store (Mestarin Herkku) and department store. The department store is divided into smaller divisions, which are the Women's world, Men's world, Children's world, Fitness and Sports, Home world, Beauty world and Entertainment world. There are also S-bank, customer owner sevice, Hesburger, Rosso Express, Presso, gift service, ticket service, parking service, make-up service, cash machine, barber shop, slot machine, style service, optician and gambling service. Jyväskylä Sokos has 210 employees altogether. The annual sales are 46 million euros and the sale area is 7500 m². Sokos was founded at Jyväskylä in 1962, and now it is making the biggest investment in the history worth of 36 million euros.

3 Logistics Department of Jyväskylä Sokos

There are altogether 9 people working in the logistics department. The employee structure is as follows: one supervisor, one accountant, four basic staff members and three persons in the receiving and sending area. The basic function in the logistics department is to receive and send materials and to get the products in a sellable form. Between these, there are of course many tasks to do if there are some problems in the material or in information. Everybody is required to use a computer program called REX and a portable computer Piccolink. The day starts at 6 a.m when the first load comes in and the day ends between 2 p.m. and 3 p.m. Everybody has their own specific work stations and the work is mainly done individually.

3.1 Purchasing Structure

Sokos itself does not do the purchasing. Intrade Partners acquires almost all the products that are sold in Sokos. Sometimes there is a need to buy locally some trademark (for example Halti) that Intrade does not offer. There is a computer program that does the ordering for everyday material based on sales. Seasonal material is ordered by the purchasing group from Intrade Partners. The information about the day's sales is updated during the following night.

Sokos has a contract with numerous consigners, but the main partner is Inex Partners Company. It delivers most of the products that are sold in Sokos. Inex Partners operates in Vantaa and every week day one truck load is driven to Jyväskylä. The other consigners deliver the products sometime during the working hours (6 a.m-3 p.m). Quite large quantities of the products are made abroad, and some of these consigners are not very reliable with the shipping. There are numerous difficulties with these products everyday and that influences the work efficiency. There are problems with the quantity, scheduling, pricing and sometimes even with the quality. Intrade Partners is doing the best they can to control these mistakes but very little can actually be done. This is the harsh truth and unfortunately everybody has to live with it.

3.2 Logistics' Process Model Area

Receiving the shipments is carried out in a specific area reserved for that. There is always one person in charge and this person must control that nothing suspicious goes in or out. This person in charge or his assistant must be there when the deliveries come and sign them. He receives the shipments, checks the quantity and quality, unloads and transfers the packages to the handling area. He opens the boxes and numbers the shipping lists and packages for the handlers. See **Appendix 1.**[1]

[1] Sokos logistics handout

3.3 Getting the Products in a Sellable Form

The product refitting is made in a separable area. The goal is to be very efficient and quick. The product refitting contains certain things: receiving note to the computer, quality and quantity checks, pricing and error notifications. Everybody has their own work space and computer. All the packages is done alone except some bigger shipments and pallets. After the unwrapping and pricing the products need to be taken either to the marketing parking lot or to the normal parking lot. The marketing parking lot differs from the normal parking lot in that there is always some marketing campaign going on or coming and these products cannot go inside the sales department until the marketing campaign starts. See **Appendix 2.**[2]

3.4 Error Notifications

Within the logistics team, there should be one in charge for the error notifications. In Sokos the person is the supervisor. Error notification is done if the product is not in a sellable shape. This means for example a broken product, wrong product or a missing product. Every handler does the error notification in the sale refitting process but this person in charge (supervisor) handles the error shelves and the communication between the companies and refunds. If the defective products get through the quality check of the sale refitting process, the sales person does the error notification. There should be mutual rules about all of the procedures that are concerned about the error notifications. There are separable shelves for faulty items and the superior is in charge of those. The damaged products are kept there for two weeks after the termination order or sent back to the consigner.

[2] Sokos logistics handout

3.5 Security

You cannot let anybody from the outside to the receiving area without decent supervision. All the work equipment needs to be in good shape and you must always follow the general security guidelines. All the security matters are gone through separately with the security officer. In the logistics security the following matters are important:

- Samples go only through the sales department
- Do not go in or exit without permission
- The back facilities need to be in order and clean also during the renovations
- Interns cannot receive shipments
- There must always be somebody in the receiving area between 7a.m and 3p.m
- Outside the working hours nobody can get in without a key or code
- Elevators needs to be coded to prevent unauthorized access
- All the information coming via loud-speakers needs to be heard
- Fire exit signs need to be seen.

4 Material Management Functions

4.1 Introduction

Materials management is one important key function in the company. *"Material management is to coordinate all business activities that are part of the materials cycle, from supplier through company operations and on to the customer."* [3]

If the material is not at the right place at the right time in the right condition it could cause major losses for the company and for the customer as well. In the company the material management should be taken into account in every logistics activity.

[3] Magad-Amos 1999, Total Materials Management, p.3

4.2 Goals of Material Management

The main objectives in material management are: low costs, high levels of customer service, quality assurance, low level of tied-up capital, and support to other functions as shown in **Appendix 3.**[4] Clearly each objective of material management is strongly linked to the overall goals and objectives of the company. However, sometimes it is necessary to do some trade-offs among the objectives using the broad perspective of material flow throughout the total system. [5]

In the receiving area and in the stores these actions should be done:

1. Receiving materials which include verification that the order was made and the quantity received is correct and preparation of a receiving report.
2. Storing received and inspected materials in accordance with efficient operating procedures that optimize the use of space, equipment, personnel and control of location.
3. Issuing materials with authorized requisitions and accepting returned materials.
4. Maintaining control of physical counts to assure materials availability and performing periodic and annual physical inventories.[6]

[4] Li Yumei, 2004 . Improving Warehouse Management in household Equipment Supplier, Batchelor Thesis, p.13
[5] Li Yumei, 2004. Improving Warehouse Management in Household Equipment Supplier. Batchelor's Thesis.
[6] Magad-Amos, 1999. Total Materials Management, p.14

4.3 Data and Information Systems

Without any information system the different departments cannot communicate between each other. It is always essential to use the ERP-system (Enterprise resource planning) as a base for good and efficient communication. The telephones, faxes, e-mails etc. are widely used inside the company for daily operations.
To get the message through to people and achieve productive communication, these issues must be taken into account:

- **Backround:** you have to consider the family background, ethnic group, religion, education and nationality.
- **Team relationships:** people will tend to identify with certain teams and develop loyalties and personal relationships in the teams.
- **Expectations:** the receiver always has some expectations of perceptions and interprets the message according to those.
- **Education:** the level of education makes a difference in the receiver's interpretation of the message.
- **The situation:** the situation in which the message is given affects the result of the interpretation.
- **Standards of individual ethics and ideas:** ethical considerations strongly influence how the message is viewed.
- **Personal welfare:** When the message directly pertains to the personal welfare and interest the message is given greater attention. [7]

In order to stay in touch with the material flow you need some kind of data gathering system. With this system you are able to plan and control the material flow steadily and you should see how much material is handled everyday. The data gathering system also helps you to do the mandatory forecasting operations.

[7] Magad-Amos, 1999, Total Materials Management, p.490-491

4.4 Warehouse and Storage

In the early days a warehouse was "a soft landing to the retirement."[8]
Nowadays it is one of the key parts of the logistical chain.
"There are almost one million warehouses worldwide and warehousing plays a vital role in providing a desired level of customer service at the lowest possible costs."[9]

According to Dr. John A. White, Dean of engineering at Georgia Institute of Technology, there are some contributors which are needed to create world class warehousing.[10]

Quality: The ultimate goal of quality warehousing is to eliminate delays, errors, and damage in movements, storage, protection and control of materials.

Inventory Management: It is essential that the company's inventory control system has data integrity and maintains proper inventory levels.

Technology Application: A world class warehouse can use integrated combinations of manual, mechanized and automated systems. Be aware that new, unproven technology can be very risky.

Flexibility: The advantages of various technologies related to flexibility are essential in a dynamic business environment. The key is to match flexibility requirements with the application.

People: You need to invest in employee education and training.

Integrated Thinking: Closer relationships with customers and suppliers are important. However, it is equally important to develop close internal relationships within the company.

[8] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.3
[9] Lambert-Stock-Ellram-Grant, 2006, Fundamentals of Logistics Management, p. 229
[10] Magad-Amos, 1999, Total Materials Management, p.17-18

Financial Performance: Warehousing should not be viewed as a cost consumer, but rather as a revenue enhancer. Effective financial performance, together with other attributes discussed above, can make the warehousing a strong contributor to a company's competitive position.[11]

Warehousing in the department store is a bit different than in factories. Department stores do not order the material straight from the manufacturers because it would be tricky and very uneconomical. Also the warehousing inside the stores is not suitable because the amount of tied up money would be fatal, and the space requirements would multiply.[12]

The main functions for stores are to sell the material, set up the material into the shelves and keep small cash funds to satisfy the customers. The main warehousing actions are transferred to the wholesalers. One part of the warehousing can also be transferred onwards to the manufacturers if the wholesaler does not have the adequate spaces for example.[13]

[11] Magad-Amos, 1999, Total Materials Management, p.17-18

[12] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.11

[13] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.14

5 Inventory Management

5.1 Inventories

Monitoring inventory levels is a key function of inventory management. A number of techniques are used to establish a policy's priorities and monitor inventories.

According to Magad-Amod, the inventing means controlling each inventory item and maintaining accurate records of stock on hand.[14]

"Successful inventory management requires adequate records, maintenance, including both physical and financial control. The records provide managerial control, together with inventory evaluation methods, store-keeping and security. The inventory records include such data as":

- Part number and names
- Brief descriptions
- Storage location
- Lead times
- Safety stock
- Supplier's names and addresses
- Cost
- Yield
- Group parts and assemblies used
- Substitutes, if any[15]

[14] Magad-Amos, 1999, Total Materials Management, p.133
[15] Magad-Amos, 1999, Total Materials Management, p.129

Here are the most popular reasons to hold inventories according to Lambert and co-workers:

- achieve transportation economies
- achieve production economies
- take advantage of quantity purchase discounts and forward buys
- maintain a source of supply
- support the firm's customer service policies
- meet the changing market conditions
- overcome the time and space differentials that exist between producers and consumers
- accomplish least total cost logistics commensurate with a desired level of customer service
- support the just-in-time programmes of suppliers and customers
- provide customer with a mix of products instead of a single product on each order
- provide temporary storage of materials to be disposed of or recycled.[16]

Reasons against inventories:

1. Increased carrying costs (taxes, insurance)
2. Decreased customer responsiveness –inventories obstruct production systems and the ability to respond to change is diminished.
3. Increased production coordination –more management time is needed to manage and coordinate large inventories.
4. Reduced ROI –inventories increase assets of the company.
5. Excess capacity –inventories require space
6. Overproduction –large quantities cause overproduction, which may result in obsolete production.
7. Higher production costs –inventories camouflage underlying production, materials handling, scheduling, inventory control and other management problems.[17]

[16] Lambert et al. 2006, Fundamentals of Logistics Management, p.126
[17] Magad-Amos, 1999, Total Materials Management, p.107-108

5.2 ABC-analysis

This is one method to control inventories in a mathematical way. The method is named after Vilfredo Pareto (1848-1923) who is the creator of the Pareto principle. The main idea in the Pareto principle is the fact that many situations are dominated by a few vital elements: for example, 90 percent of wealth is in the hands of 10 percent of the population.

The ABC principle is a handy method when you need to categorize large data into groups. These groups are marked A, B and C. These classifications reflect the difficulty of controlling an item and the importance of costs and profitability. The ABC-analysis is usually based on the annual euro volume, but in practice you need to take into account many other criteria as well:

- Unit costs
- Costs of stock out
- Storage requirements
- Risks of items in stock
- Critical requirements

In the examination of these factors, you need to determine the most critical factors, then ranking the inventory items in a descending order of importance and finally agree on the appropriate ABC classifications.

A items: High value, tightest control, accurate records maintained, highest priority, careful order quantity determination and close evaluation of forecasts.

B items: Normal control, normal processing and use of EOQ (Economic Order Quantity).

C items: Basically simple control, few or no records, lowest priority and large order quantity.[18]

In the following table you can see the idea of the ABC-analysis.

Table 1. ABC-analysis

ABC-analysis		
Type	% of total items	% total yearly E values
A	10	70
B	20	20
C	70	10

5.3 Forecasting

Forecasting is one crucial object if the company wants to control the material flow in any way. It describes for us how the future will look like and what actions need to be done in order to stay in the markets. Forecasting is concerned with very specific information such as the kinds of markets, the quantity of sales, price ranges, new technological development, anticipated wage rates, new tax rates and policies and many other important factors.[19]

[18] Magad-Amos, 1999, Total Materials Management, p.124-125
[19] Magad-Amos. 1999, Total Materials Management, p.73

The forecasting functions have four important objectives for the company:

1. To cope with uncertainty and change
2. To focus attention on strategies
3. To facilitate the process
4. To increase efficiency[20]

The composition of the company's forecast is often affected by many factors. Also different forecasts are made by different managers and this can lead to uncoordinated strategies. At least these things should be taken into consideration when making the forecasts.

Considering Alternatives: You need to be constantly aware of all future opportunities and visualize them clearly and completely. Analyze the consequences, problems and expected gains.

Implementing Strategies: To avoid overlapping strategies the organization must interconnect the different strategies into one.

Developing Strategies: When developing strategies for logistic department the management need know and consider the company strategy as a base for the new one. Be aware of plans, policies and critical information.

Written Strategies: Eventually all the forecasts must be put in writing to include both qualitative and quantitative information.

Forecasting information: National-level economic forecasts are made daily. Use the information which is very reliable and ready for you.

Follow-up and Revisions: All forecasts are subject to some degree of error; even the best analysis cannot guarantee complete accuracy. Find out the error marginal and do your best to minimize the errors. Because of the inaccuracy of the data, forecasts need to be updated and revised regularly.[21]

[20] Magad-Amos, 1999, Total Materials Management, p.81
[21] Magad-Amos, 1999, Total Materials Management, p.74-76

5.4 Just In Time (JIT) Management

The JIT system was established in Japan in the early 1970s. There was a need to build a new system and Japan being an island, there was only a little space to use. The idea of "simplicity is beautiful" made the ground for JIT. Inside the Toyota factories this system got started and was perfected by Taiichi Ohno, who developed a system that met the consumer demands with minimum delays.[22]

JIT management is a philosophy, not a technique. It originally referred to the production of goods to meet customer demand exactly, in time, qualitatively and quantitatively. Nowadays this method means to produce material with minimum "waste". Waste is any activity that does not add value for the company. Still the main idea of JIT is that the customer/consumer gets the product at the right time, in the right condition and with the right quantity.[23]

There are seven types of famous wastes according to Shigeo Shingos:

1. Waste of overproduction
2. Waste of waiting
3. Waste of transportation
4. Waste of processing itself
5. Waste of stocks
6. Waste of motion
7. Waste of making defective products

There are suggestions for how to avoid these seven wastes and get your business more profitable.

[22] Magad-Amos, 1999, Total Materials Management, p.184
[23] JIT manufacturing, Institute of manufacturing by Cambridge University, www.ifm.eng.uk

The waste of overproduction can be avoided by compacting layouts, reducing setup times, synchronizing quantities and timing between processes. Make only what is needed.

The waste of waiting can be eliminated by synchronizing work flows and balancing them by having flexible workers and equipment. Time is money.

Designing layouts to reduce/eliminate materials handling minimizes the waste of transportation. Transportation can take a lot of time.

By questioning, why this part or product should be made and why each step of the process is necessary, you can avoid the waste of processing itself.

Waste of stocks can be avoided by employing various techniques for becoming more efficient, including shortening setup times, synchronizing work flow and providing flexible facilities. Inventories tie up the company's money.

Employ motion economy techniques to improve the waste of motion. Consider mechanization and automation as alternatives.

Develop the production process to prevent making defects and to eliminate the need for inspection. Each point in the production process should accept no defects and make no defects.[24]

[24] Magad-Amos, 1999, Total Materials Management, p.190

To adopt the JIT philosophy for your company, it necessitates at least the following things:

- Few suppliers and manufacturers
- Frequent deliveries
- Suppliers are located near the next workspace
- Small purchasing and manufacturing shipments
- Quick reaction to the changes of the markets
- Right transportation modes and routes
- Intensive information flow and exchange[25]

With the JIT system the company can save a lot of money if the system works fluently and the cooperation with the suppliers and manufacturers is effortless. Here are some advantages of using the system.

+ The order expenses are minimized
+ Only little money is tied up for unfinished products
+ Good communication between suppliers and manufacturers
+ On time information about the timetables and material flow
+ Secure quality, no need for own quality checks
+ Space savings

5.5 Enterprise Resource Planning (ERP) System

"Enterprise resource planning (ERP) is a company-wide computer software system used to manage and coordinate all the resources, information and functions of a business from shared data stores."[26]

[25] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.7
[26] ERP, www.wikipedia.org

In the early days only big companies were able to use the ERP system in order to share information smoothly inside the whole company. Today the use of ERP is changed and almost every company, commercial or non-commercial, is using it no matter what industry it falls in.[27]

Not any kind of software is eligible to be called ERP; it has to provide for the organization at least two systems. There are packages that provide only these two systems, for example payroll and accounting, but usually most ERP systems cover several functions and unite them into one database.[28]

The main reason for using an ERP system is the integration. With the system you can integrate almost all the key function programmes into one and the communication between departments and people is easier. The ERP systems also creates a good base for other systems, for example material requirement planning (MRP) needed in the company.

> *The MRP is a technique for determining the quantity and timing of demand-dependent items and rescheduling orders to adjust to changing requirements. Although MRP ensures that materials will be available at appropriate times, it is of little value unless sufficient capacity is available. Capacity requirement planning (CRP) determines what personnel and equipment resources are needed, including material handling, to meet the production objectives set forth in MRP.*[29]

[27] What is ERP? Database for technical tutorials and articles, www.tech-faq.com
[28] What is ERP? Database for technical tutorials and articles, www.tech-faq.com
[29] Magad-Amos, 1999, Total Materials Management, p.171

6 Personnel Resources

6.1 Teamwork

In the logistics department real team work is required for maintaining the fluent material flow. According to a definition of a team is:
Real team is a group of people with different skills to complete each other, who are committed to the mutual goals and keep themselves jointly responsible for their achievements.[30]

In order for the team to work it has to grow into a real team. The achievement is based on three basic factors: Commitment, responsibility and skills.[31]

Commitment is the first and crucial factor in the teamwork. The main goal for the team is always associated to the goal of the whole company. Setting objectives and goals has to be done carefully so the team should form achievement based actions. Objectives should be achievable and realistic but still high enough to satisfy the company goals.[32]

Responsibility means that the team is responsible for the work they are doing individually and together with the team. The inner responsibility of the team is a process which develops together with the team. .[33]

Skills and know-how is the vital factor for the team. The advantage of the team is that everybody does not have to have the same skills. The team should group so that the people's skills should be completing each other. The team should also maintain versatility and educate the skills further in order to keep up in the market. **Appendix 4**.[34]

[30] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.44
[31] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.45
[32] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.45
[33] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.46
[34] Mustonen-Pouri, 1994, Tehokkaaseen varastotoimintaan, p.46

6.2 Changes

The Jyväskylä Sokos logistics department is going to make a big change in the beginning of the year 2010. This change is very beneficial for the company but could be a bit strange and challenging for the employees. The change will affect almost everything that the employees will do in the future: a different working space, different working environment, different working methods, different scheduling.

When there is this kind of dramatic change in everything that the employees do there is also some kind of rebel or lack of motivation involved. The changes are more likely to be acceptable when:

- They are informed immediately
- They are understood, and the reasons why the change is necessary are given
- They do not threaten the security of the enterprise
- Those affected helped create the changes
- They result from the application of previous established impersonal principles instead of being dictated by personal order
- They follow a series of successful changes rather than a series of failures
- They are inaugurated after prior changes have been assimilated and not during the confusion or other major change
- They have been planned and are not experimental
- People are new on the job
- People share in the benefits of those changes
- The organization has been trained to accept change.[35]

[35] Magad-Amos, 1999, Total Materials Management, p.86

There are also some typical problems in changes, and knowing them you can avoid at least some of them:

1. Lack of commitment
2. Inaccurate forecasting
3. Lack of implementation
4. Inadequate leadership[36]

There is also one known figure illustrating change available. The appendix 5 tells us how the customers are going to react after the change. **Appendix 5.**[37]

6.3 The Use of Time

There has been a research into the use of time among the employees. It analyzes the time distribution for one working day:

1. Preparation time is used for preparation and completing a work phase. It exists only once per each work phase and it is independent on repetitive actions.
2. Effective work time is which is consumed doing one work phase.
3. Help time is needed for maintaining the work conditions which can be dependent on the work time or the work itself.
4. Intermission time considers the personal needs or tiresome quality of the work.
5. Interruption time is independent of the employee.

With these five time definitions, you can calculate the time loss which is the time that the employee consumes for unnecessary functions.[38]

The use of time varies a lot between employees and it is almost impossible to detect the most common time losses (= the time which is consumed unnecessary) because every employee has usually their own delays inside the work. The only way to get rid of the unnecessary time losses during the work day is to keep record of everybody's time consumption and give feedback according to those facts.

[36] Magad-Amos, 1999, Total Materials Management, p.87
[37] Mustonen-Pouri, 1994, Tehokkaaseen varastoitoimintaan, p.5
[38] Lehmuskoski, 1982, Varastoinnin johtaminen, p.52

7 Material Management Functions in the Logistics Department

7.1 Data and Information Systems

There are three main tools to control all the activities needed in the logistics department. The main software is called REX and everybody uses this software every day when handling the products. The REX software was established in 1990s and since then there has been a development group working with it to improve the software. In every Sokos department store there are members who are called the head users and all the head users compose a development group which gathers up every year to evaluate the new possibilities of the REX program. The REX system is not only a tool for logistics employees; it is also a tool for the sales persons and office workers.

As a sales person, you can use the REX system for example for product enquiries, orders, error notifications and transfers between the Sokos department stores around Finland.

As an office worker, you can use the REX system for example for inventory, correction of the quantities, invoicing and changing the price.

As a logistics employee, you can use the REX system for example for incoming material check, arrival check, error notifications, transfers and returns, and ordering price tags.

The REX system is an everyday tool for logistics employees and without it you can not fulfill your work tasks. In addition to the software, there are portable computers, Piccolinks, which communicate with the REX system, and Piccolinks are linked properly with REX so you can work only with a Piccolink also if needed.

Piccolink is a portable computer which uses EAN-codes for information search. It works individually without the REX program but for logistics purposes you also need the REX system at some point during the day. With a Piccolink you can order price tags for the shelves, do the arrival check and material check but with the last one you need to do the last actions with the REX system on a real computer.
Piccolink is also a tool for sales persons and they are use it for inventory, ordering and checking the quantity of material. Inventory is mainly done only using the Piccolinks and without them the inventorying would be very slow and inefficient.

The last resource for help is the Intranet. The main user for Intranet is the supervisor, but there are two more people in the logistics department who have access to it. The Intranet is a very important route to share information beyond the department store boundaries. There is everything you need to know about everything, but the main actions which are used in logistics are the forecasts of incoming material, reports of new development projects, information search, sales actions and the latest news and announcements.

The most important information concerning the logistics department is the forecast of incoming material. The data is given on a weekly basis and you can see the number of items which are coming and how much money is involved with those items. These statistics are the main resource for the supervisor to know and control the material flow but unfortunately these numbers are based on advance orders and the accuracy is pretty poor. In other words the logistics department has only a bad forecast about the future. Nobody knows exactly how much material is coming in each day.

The Intranet is useful for the sales people also to detect the incoming material. They can search data by labels and use the information to plan and clear the room for new incoming seasonal material. Unfortunately the information is also based on advance orders, so there could be plus or minus two weeks of delay and the specific time for new labels are very hard to forecast.

7.2 Warehouse and Storage

The warehousing is done at Inex Hakkila, which is the main warehouse for all S-group companies. Every night one truck load is driven to Jyväskylä Kaukokiito Taipale's distributing center and the material is unloaded and reloaded there according to the shipments, and then driven to the Jyväskylä Sokos in the morning.

There are no actual storage capabilities inside the logistics department or inside the whole department store either. When the material comes in every morning, the goal is to get the material refitted and ready for shelves during the day. There are only small facilities for the employee to work in, so all extra material inside the logistics department is inefficient.

Sokos has a lot of marketing campaigns during the year around and these materials cannot go to the sales departments until the right date. This causes a bit of inconvenience for the employees, because the material can come weeks, or in some cases, a month before and this material need to be stored somewhere. The storage space is then unavailable to the employees and the work space becomes smaller.

The defective items also need to be stored somewhere inside the logistics department and this takes room, too. Every defective item should be stored for two weeks unless those have been returned for the supplier. Some suppliers want the defective items back, although they first might have given the order to get rid of them.

There are five different sales periods in a year and of course the materials need to be changed in every period. Not all the campaign material is sold out during the specific time period, either and this material needs to be stored somewhere. Sometimes there is an order which is too big, and some amount of material does not fit into the sales shelves. These materials are stored into small storage rooms around the department store. This storage space is usually full and sometimes there is a need to relocate the material into the logistics department. Sometimes there are all kinds of materials and stuff lying around in the logistics department and the sales persons do not care although the space in there is limited. The focus is on getting the cycle rate up and recycles the material so that there would be less need to store the material for a long time.

8 Future Tools to Manage the Material Flow

8.1 Morning Load

8.1.1 Introduction

The concept of morning load has existed for a long time. There have been many trials to carry out this method successfully but yet it has not been worked out properly. Now it is time to try it again with new perspectives and innovations.

The main idea of this method is to decrease the material inventory in the logistics department. Using this method successfully, it can downsize the time by a whole day. Usually, when the first load comes in the morning, that day's material cannot be delivered to the shelves until the next morning. With the morning load method, the incoming material is transferred straight to the sales area and the refitting process is done there and the products can be sold on the same day.

8.1.2 Implementation of the Morning Load in the Company

8.1.2.1 Planning Beforehand and Scheduling

This loading method requires co-operation between the logistics department, sales persons and visual marketing. In able to succeed, everybody needs to do their own part of the plan. The goal is to do the work before the shop opens (6-9), but in some circumstances this time period can be negotiable. The whole shop is divided into several areas and people are divided between them. The number of people working with the morning method can be variable by the experienced knowledge but the minimum is one logistics person per one sales person. There are some guidelines for the incoming material flow on the Intranet but these numbers cannot be trusted as an absolute truth. It is important to take into account the season changes, campaigns and other high peaks in the flow, so that more people should work on the morning load. The scheduling is also done considering the sales and sales volumes in the specific district. The most important thing is to plan and do all that can be done before the next morning. This helps the staff to concentrate only on the task at hand.

8.1.2.2 Working Process

In the receiving area of the logistics department, the shipment is sorted into two different stacks: going straight to shop and going to the logistics department to wait for the refitting process. The incoming note is stapled with the shipping list and sent in with the package. All the morning load material is divided between the certain districts to the certain place. At first the only materials that need to be morning loaded are Beauty World’s material and Home World’s material. These materials have been chosen for this because the material is everyday material, there exists shelves place for the material, and there is no need to price the material.

The logistics personnel's job is to do the refitting process next to the roller cage. There is always another person for the logistics personnel from the sales department and this person carries the unloaded and checked products onto the shelves. There is also one named person who takes care only of the garbage and waste. He or she starts on the ground floor and goes upwards. The morning load can continue after the department store is opened, but if the mess or work itself disturbs the customers the work continues in the logistics department.

Every action inside the department store is done with the portable Piccolink computer, but afterwards the employees need to reaffirm the packaging lists and do the error notifications if needed with the REX on a real computer. This takes some time, but is more efficient to do the work with a Piccolink.

8.1.2.3 Research

There was a research done regarding the morning load. The main idea was to detect how much material can be handled during the first two or three hours with the morning load method. Every employee at a time was clocked with the work and notes were taken. The main data were calculated on the basis of the IP numbers of the orders and so the number of peaces done and the number of rows could be detected. Only Beauty World's material was used and detected. There were unprofessional workers and professional workers involved in this research, so the results are really realistic. The results can be found in **Appendix 6**.

In conclusion there, was data showing that the morning load is profitable and when the whole logistics department is doing the work together, the incoming material can be managed into the shelves within the given time frame (three hours). Also the time after the morning load with the REX system was clocked, and it showed that the time consumed afterwards was insignificant.

8.2 Handling Center

8.2.1 Introduction

The S-group and Inex Partners have made a contract that the refitting process done in the logistics department of Sokos is to be relocated to the Inex Partners' handling center facility at Vantaa. This process means less work for the logistics department and a more efficient flow of materials. The changeover starts phase by phase and the first deadline is in 2012. In the end of 2012 should be that the only task for the logistics department is to receive the material and take care that the products are on the shelves. Right now only one product group is under this contract but on the first of June this year it is accompanied by the another product group. This contract is under a test run, but so far it seems to be working fluently and it will save an enormous amount of time.

8.2.2 Implementation of the Handling Center in the Company

In the logistics department the main task is the refitting of the incoming products. After the handling center has come to everyday use, the main task is to provide a safe and efficient flow of incoming materials into the sales departments.

Right now there is only one product group, shoes, under this handling center, and later this year, also the campaign products of the Beauty world are joining the contract. This means a lot of time saving for the logistics staff members and time savings are in need when observing the material flow in the future. Although shoes present only seven percent of the material flow, they were adopted first by the handling center because they were the most time consuming items.

Before the handling center contract, refitting the shoes was a time consuming process. After quality and quantity checks there was a need to print a price tag for every shoe pair. After that it was needed to place the tags on the shoes according to instructions. This was a long and prolonged process. Now everything to be done is to scan the bar code outside each shoe box and put the shoes into rolling cage. The actual time and financial benefits can be seen in **Appendix 7.**

The next product group coming under the handling center is Beauty World's campaign products. This means also huge time savings because the beauty campaign products represent quite a big amount of the all the incoming material. There is almost always some kind of campaign going on in the beauty department and therefore these products were adopted second for the handling center contract.

The handling center is a relatively new method for the employees and for the Inex Partners as well. This method needs to be taken into account as an unsatisfactory action and the evaluation of the handling center needs to be done. There is an evaluation charts on the Intranet, where the supervisors are collecting the data and feedback from the handling center.

8.3 JIT

The Jyväskylä Sokos logistics department has been using the JIT system in their everyday work for a long time. The main idea is to have to material delivered just before it is needed which is the goal that the S-group has given to every Sokos logistics department.

The JIT method is almost the only choice when considering the space utilization inside the logistics departments. There is no extra space for any kind of storage because the working spaces are limited. Also the new method of morning load needs a JIT system to back it up in order to actually gain the advantages that have been planned. The delay of one day eliminated in the morning load method is ruined if the material does not arrive in the morning as well.

At the moment in the Jyväskylä logistics department the first work in the morning for the employees is to receive the main material delivery at 6 a.m. If this delivery is late or does not arrive, there is no work for the employees to do unless there has been a big delivery the day before and there is still some material left to be refitted. This JIT has been working very well and the load is usually a bit early. The only downside of that delivery is the fact that nobody knows the actual size of the delivery.

9 Suggestions and conclusions

9.1 How the Changes Should Be Dealt with Inside the Company

Right now most of the employees are quite elderly and have been working for the company for decades. Every small and big change is going to be hard for them and learning new things takes some time. The biggest fear for every employee is the fact that every time something new comes up, the work load becomes smaller and eventually there is not enough work for everybody. This fear is actually groundless and this information should be clearly stated into the employees mind. Without any reassurance of the permanence of one's job, nobody is willing to give 110 percent of themselves for the new job.

Motivating people to work as a real team and communicating over the conventional boundaries makes the work a lot easier for everybody. Of course every team and department is used to working wile familiar people, but now the goal is to work as a whole unit without looking in any specific department or authorized actions. When the big change comes, everybody must rely on each other and the logistics department needs to become one among other departments.

At the beginning of this major project to reorganize the whole department store, there was contact and communication between the logistics department and the remodelling department. The logistics employees could state their opinion on what they wanted and how much space they would need in the new facilities. This helped a lot everybody to understand what would be going to happen and what the future would look like. Although, in the end, the new facilities were a bit smaller and impractical for the logistics department, they could organize the facilities however they wanted.

The supervisor of the logistics department has been frank with the employees all the time and trying to make the new methods familiar to the employees beforehand. The supervisor is one member of the "pilot project" committee which is planning and testing new possible methods. The head of the department store, Tuula Sillanmäki, is one of the members in the committee, too, and this assures that the whole department store is carried along the changes and new methods. The main problem for Tuula Sillanmäki is the motivation and lack of interest in the big change among the employees. She should provide positive information about everything that is happening to them. She should also try to sell the change as a positive and helpful thing. The biggest work for her is to help the people overcome their fears (for example losing their job) and prepare them for the change. See **Appendix 8.**[39]

9.2 Better Use of Time inside the Logistics Department

In the logistics department most of the time losses come from the help time and interruption time. The help time usually is assigned between a few specific employees and sometimes when a new employee or a temporary employee starts his/her work, it could take days from the permanent worker to help this person to get started. Although there are two people working instead of one, the work efficiency is lower and the effectiveness of the whole logistics department decreases. There should be people assigned who would be trained to taka care of new employees coming into the department. The training could include information about how to teach and what to teach.

[39] Magad-Amos, 1999, Total Materials Management, p.482

The interruption time took earlier quite a big amount of the effective work time. It was usual that when the salesperson did not have anything to do inside the sales department he/she came to the logistics department to chat or to see what kind of material was coming into the sales department the next day. This was really annoying and every time somebody's work was interrupted. The different aspect is when a salesperson comes to the logistics department to look for material for a customer when they knew that the material is inside the house but not yet inside the sales department.

Now when the logistics department is located in a different address than the actual department store, the interruption time is smaller or almost inexistent. The big challenge, when the logistics department moves back to the same address as the actual department store, is avoiding the same interruption culture than there was before.

9.3 Introducing the ABC-analysis to the Logistics Department

Right now inside the logistics department there are no rules or codes in which order the material should be unloaded and refitted. Employees just take the first roller cage that is situated in the waiting area. The only exceptions are the campaign materials, if the campaign is coming soon and the material comes in late.

There are some employees that almost exclusively do handle an assigned category of materials (for example one is in charge of the Beauty world and another is in charge of ladies underwear and socks) but this is not very official, and other employees do these materials, too. There are no classifications of the materials, in other words, no products are more important than the other.

There is a suggestion that the ABC-analysis should be introduced to the logistics department in order to make some basic rules for refitting the material. There is clear knowledge that the most important, in other words the most profitable, department in the Sokos department store is the Beauty world. This should mean that the material coming to the Beauty world should be well managed and there should be no gaps on the shelves. This would mean for the logistics employees that the main focus should be on the Beauty world's material, not forgetting the other departments' material.

When the morning load method is in action, the ABC-analysis would help in the sorting of the incoming material as well. The fact is that only one part of the incoming material which is delivered in the morning can be managed during the morning with the morning load method. When using the ABC-analysis, there are specific rules for the employees to work by and no confusions or complaints should come up.

9.4 Better Use of the ERP System

The main tools for the logistics department are the REX system and the Intranet. At the moment the forecasts taken from the Intranet are not up-to-date. Also the sales data and quantity of material are updated only during the night so the quantity enquiries during the day are incorrect. The suggestion is that the quantity of materials should be updated immediately after the sales, so you can be sure about your material.

The other suggestion for the logistics department is to adopt the MRP and CRP systems. The MRP system will tell you how much material is coming in the morning, and according to that the CRP system will tell you how many employees you need on that morning. The combination of these two systems would offer a great advantage compared to the old system where nobody knows how much material is coming on each day.

When using the morning load method at Sokos Jyväskylä, there needs to be quite specific information about the material. Teams are grouped so that for every logistics employee there should be at least one sales person and if there is more material than these two can handle, somebody should know about it and plan the morning according to the material flow.

9.5 Other suggestions for the logistics department

- Although most of the logistics employees have been working in the company for decades, there should be annual training and education. The motivation to and interest in working gets new view points and employees keeps up with the new developments.
- When dealing with a company that is only one part of a big organization, there is an excellent chance to use the benchmarking opportunity. Jyväskylä Sokos has been using this method itself but now when it is one part of the testing group, other Sokos stores around Finland should visit Jyväskylä and observe how these new developments have been handled.
- The campaign material has been coming into the logistics department very irregularly. There should be a time frame for the campaign material when it should come at the earliest and latest.
- There should be an evacuation plan and rescue plan for the logistics department and for the whole department store as well. This helps with the evacuation of the material going smoothly and everybody knowing what to do.
- The first delivery in the morning could come already during the night so the work in the logistics department can start punctually at 6 p.m.
- There should be at least one bigger storage place for the material that cannot be placed straight onto the shelves.
- The new methods need to be evaluated and the feedback should be given straight to the S-group, so the other Sokos department stores are able to adopt these systems as well. If the feedback is positive they should take the methods a bit further and develop these systems according to needs.

In conclusion, these new methods, the morning load and handling center, need to be taken into action when the logistics department moves back to the same facilities as the actual department store. Every employee should be heard when feedback is given.

The adoption of new ERP systems should be studied and evaluated. ERP systems would help the new methods to get a better start and would increase the amount and accuracy of the needed information

The change to the new facilities is a new and exciting event for every employee, and the preparation needs to be made properly. At the moment the efficiency in the different location has been exceptionally good because no interruptions have been able to reach the employees. This working environment needs to be kept as it is and the employees should work for it.

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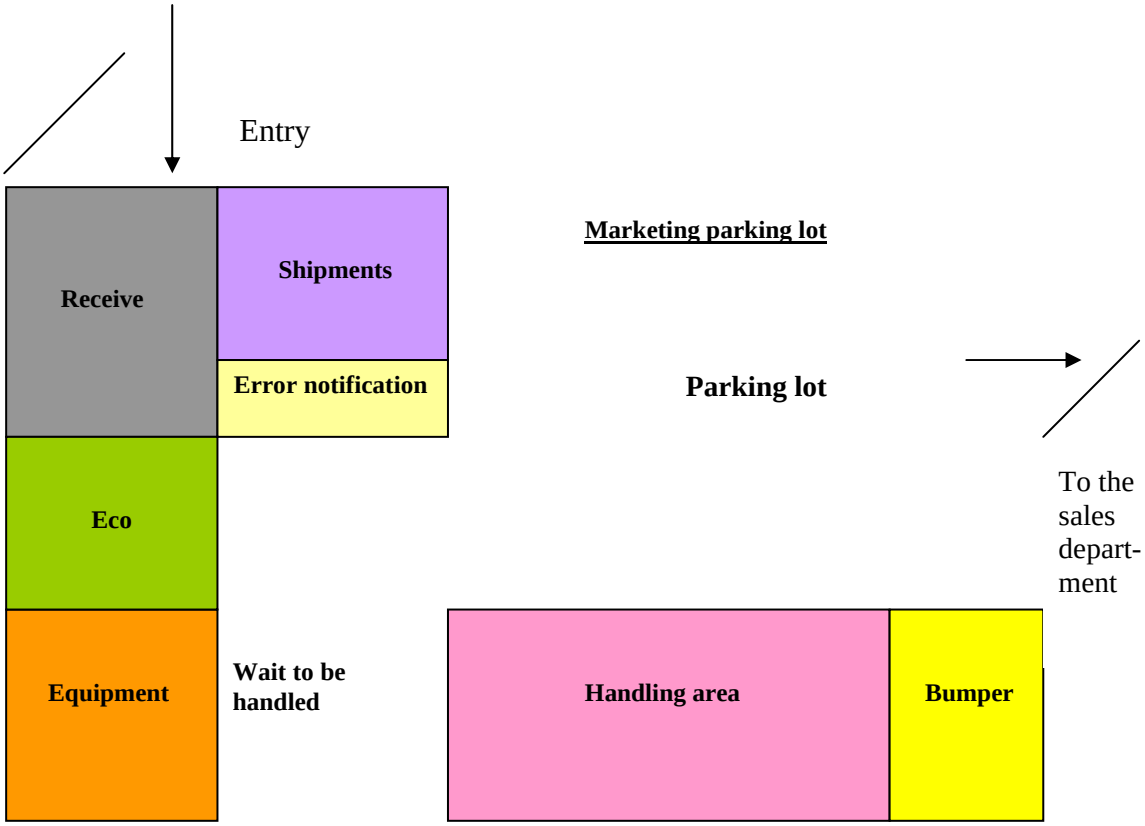
11. Company Handouts

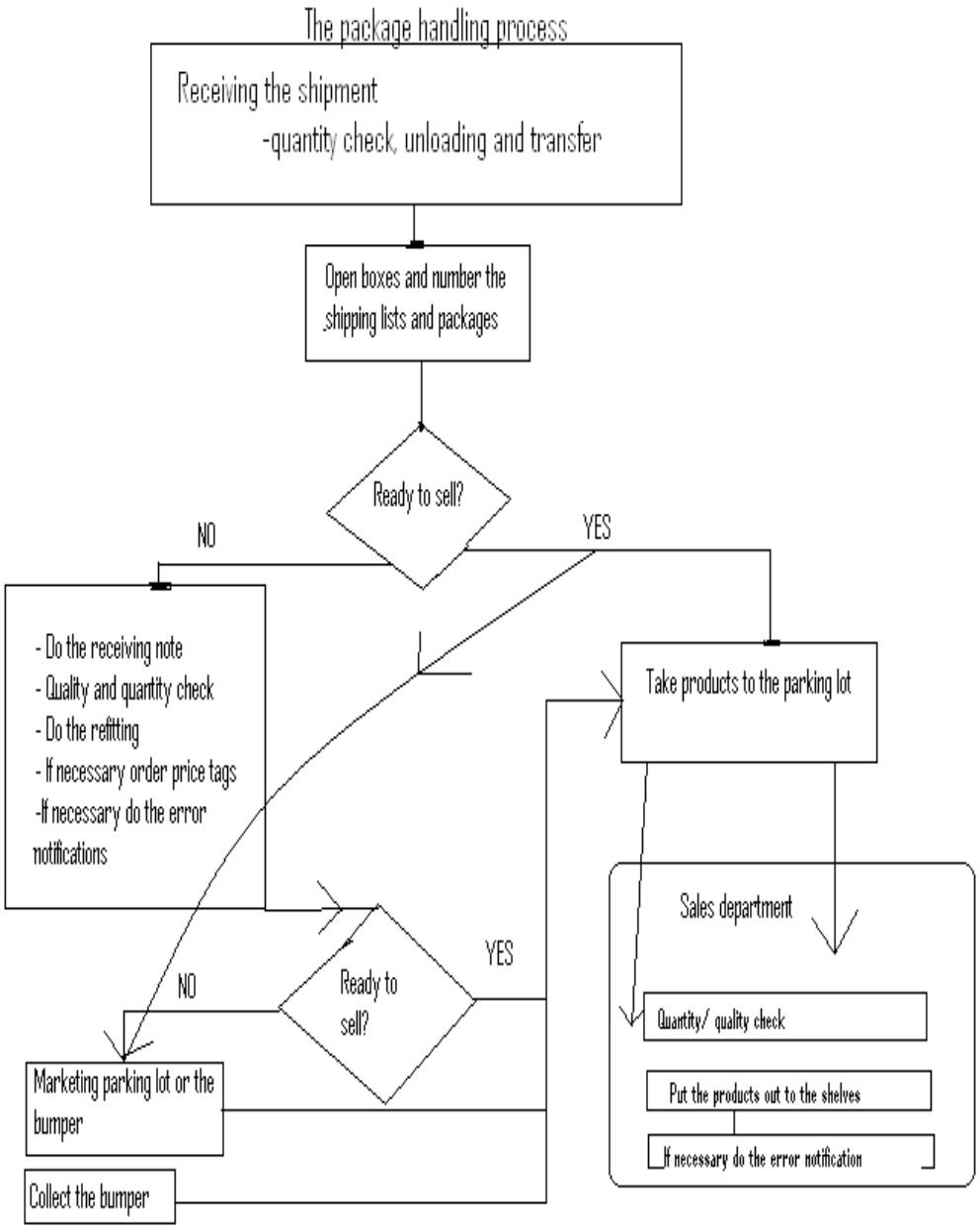
Interviews and meetings

Development group meetings:	08.04.2008, 22.05.2008, 28.08.2008
Interviews with Satu Myllyntaus	14.10.2008, 15.01.2009, 25.05.2009
Meeting with Tuula Sillanmäki	05.06.2009

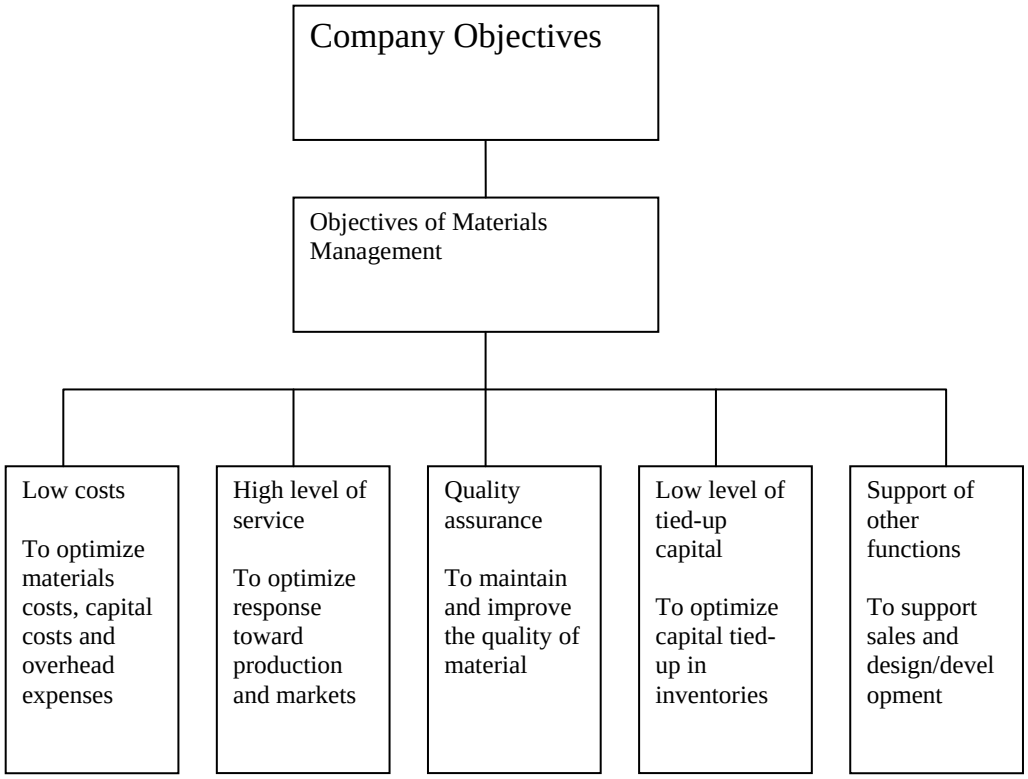
Appendix 1. Logistics' process model area



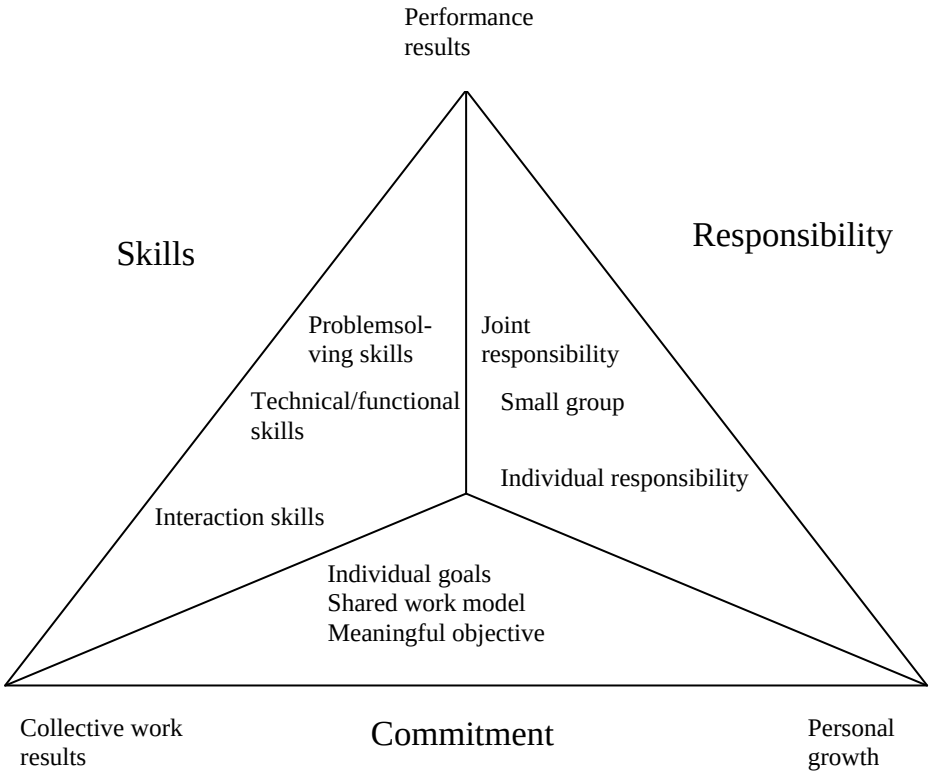
Appendix 2. The package handling process



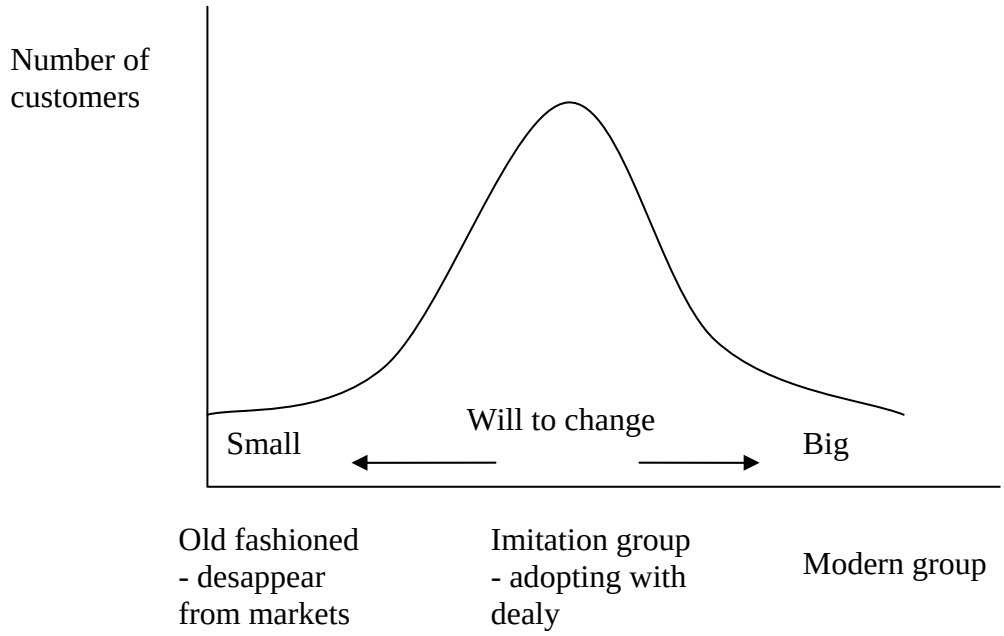
Appendix 3. The objectives of integrated materials management



Appendix 4. The basic issues when developing a team



Appendix 5. The behavior of customers in case of the change



Appendix 6. Research of the morning load

	Avg recieved pieces/order	Avg recieved row/order	Avg recieved pieces/row	checked pieces/s	checked rows/s
person 1	43	6	7	8	60
person 2	182	25	7	4,4	32
person 3	204	17	9	5,1	46
person 4	65	7	10	7	71
Avg	123,5	13,75	8,25	6,125	52,25

Appendix 7. The benefits of the handling center

	share %	hours/a	E/a	hours/m	E/m	hours/d	E/d
House 1	20	3 640	65 520,00	303	5460	**13**	227,50
House 2	6	1 092	19 656,00	91	1638	**4**	68,25
House 3	2	364	6 552,00	30	546	**1**	22,75
House 4	9	1 638	29 484,00	137	2457	**6**	102,38
House 5	4	728	13 104,00	61	1092	**3**	45,50
Jklä	5	910	16 380,00	76	1365	**3**	56,88
House 6	1	182	3 276,00	15	273	**1**	11,38
House 7	5	910	16 380,00	76	1365	**3**	56,88
House 8	4	728	13 104,00	61	1092	**3**	45,50
House 9	2	364	6 552,00	30	546	**1**	22,75
House 10	3	546	9 828,00	46	819	**2**	34,13
House 11	2	364	6 552,00	30	546	**1**	22,75
House 12	3	546	9 828,00	46	819	**2**	34,13
House 13	6	1 092	19 656,00	91	1638	**4**	68,25
House 14	6	1 092	19 656,00	91	1638	**4**	68,25
House 15	5	910	16 380,00	76	1365	**3**	56,88
House 16	3	546	9 828,00	46	819	**2**	34,13
House 17	11	2 002	36 036,00	167	3003	**7**	125,13
House 18	3	546	9 828,00	46	819	**2**	34,13
sum	100	18 200	327 600,00	1517	27300	63	1 137,50

Appendix 8. Strategic diagram for effective marketing